

Bi-directional cell

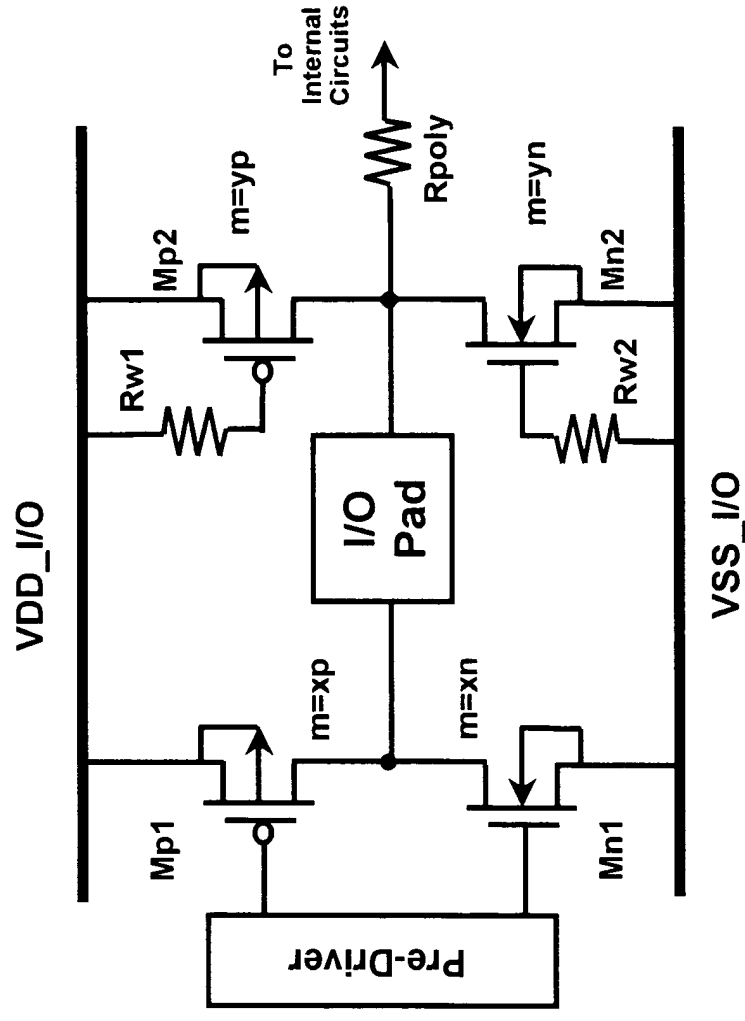


Fig.1(c)

Prior Art

FIG. 2(a) is a cross-sectional view of a semiconductor device.

Output PAD

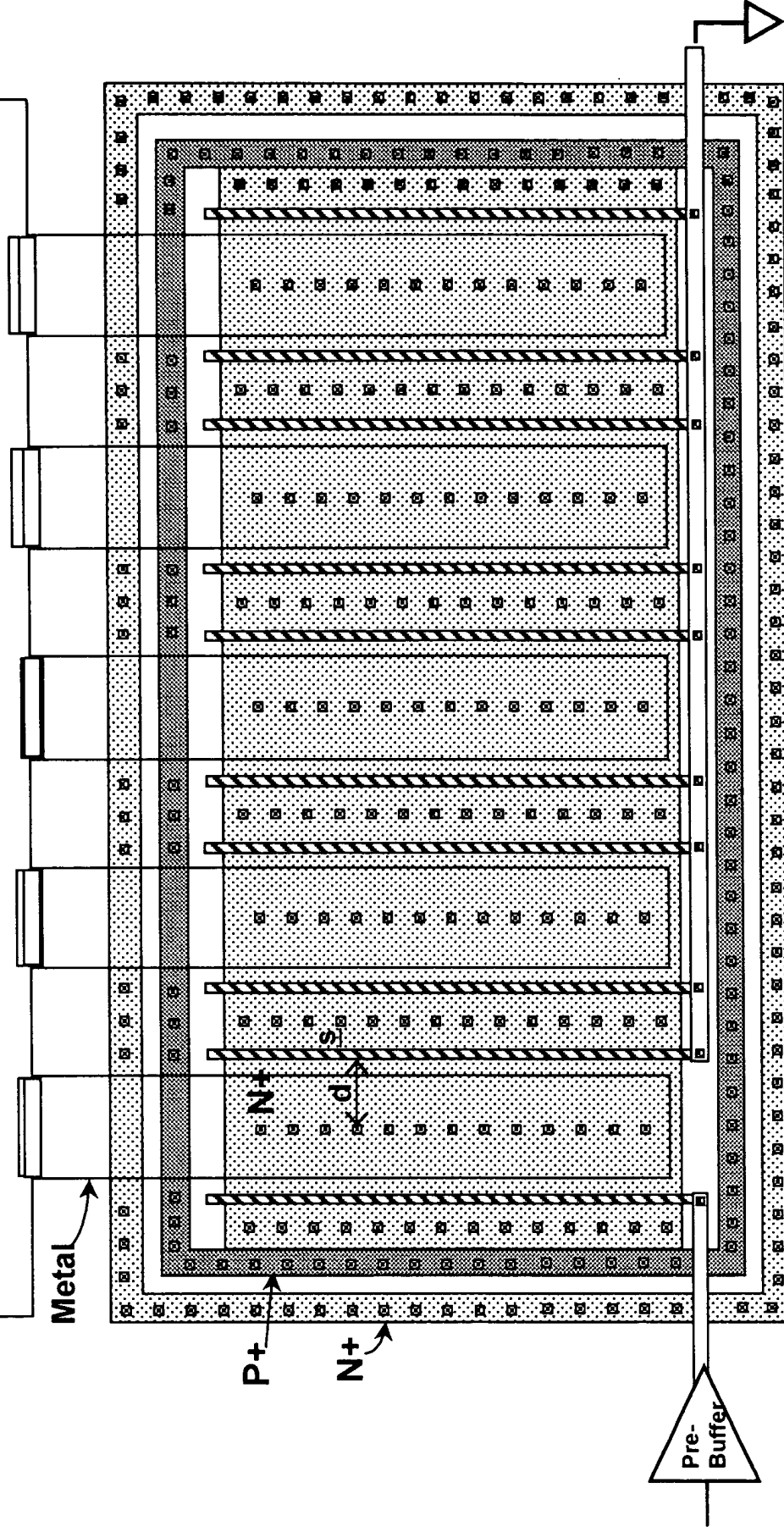


Fig.2(a)
Prior Art

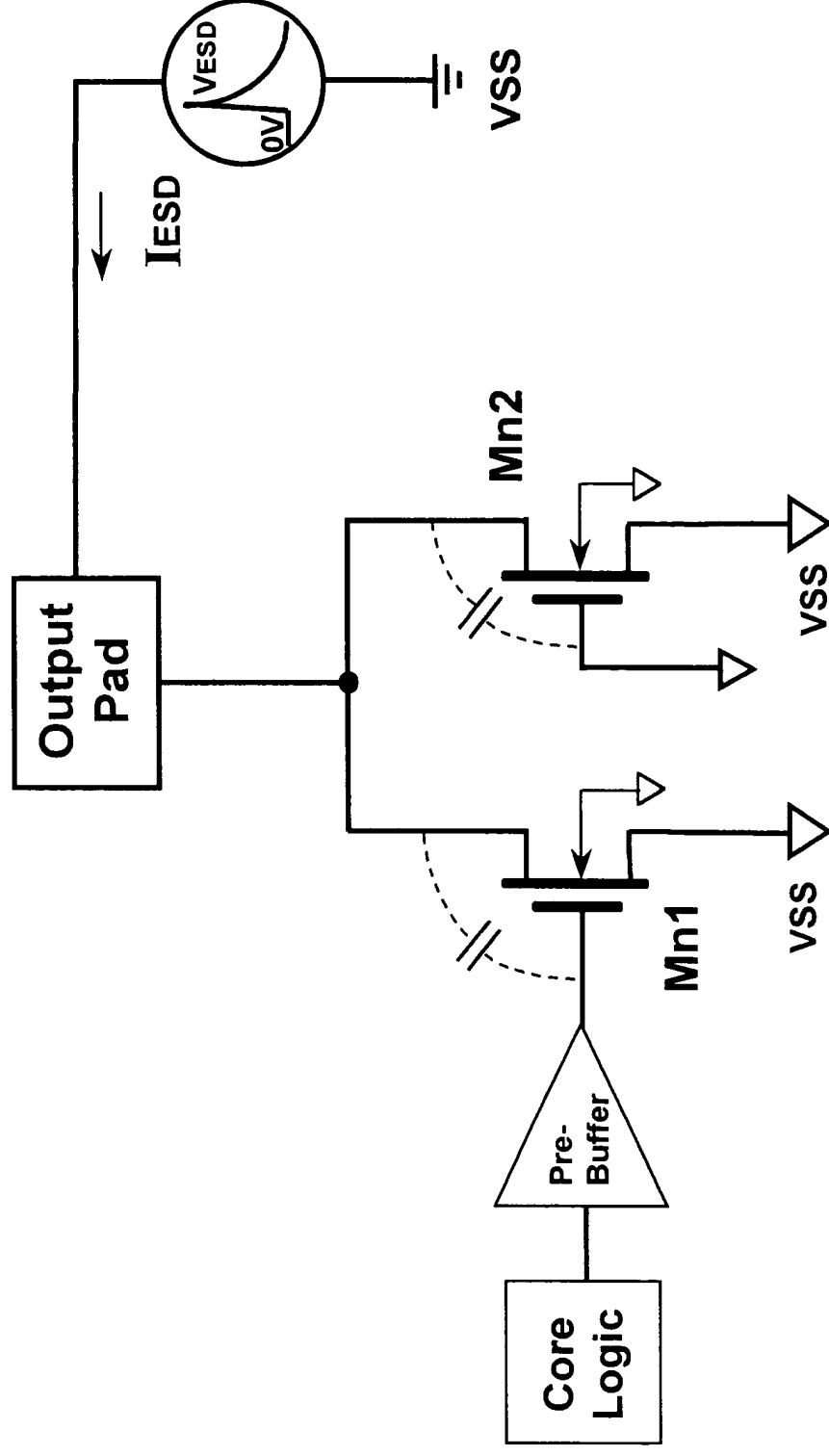


Fig.2(b)

Prior Art

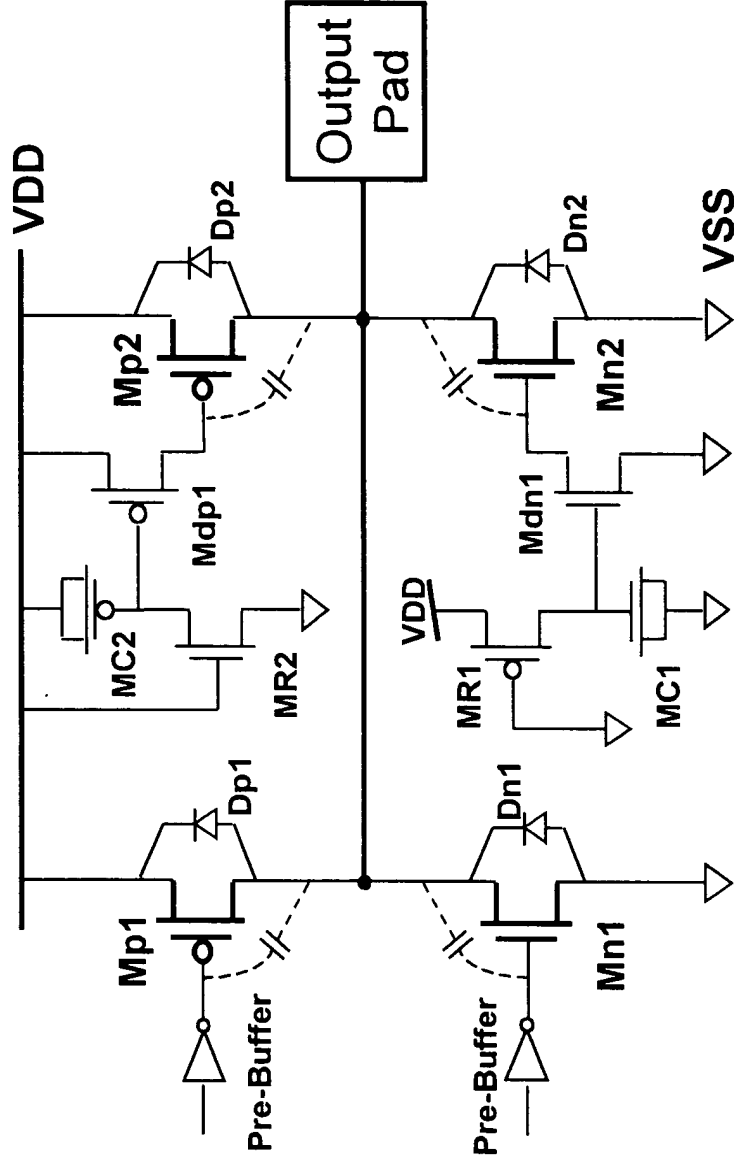


Fig.5
Prior Art

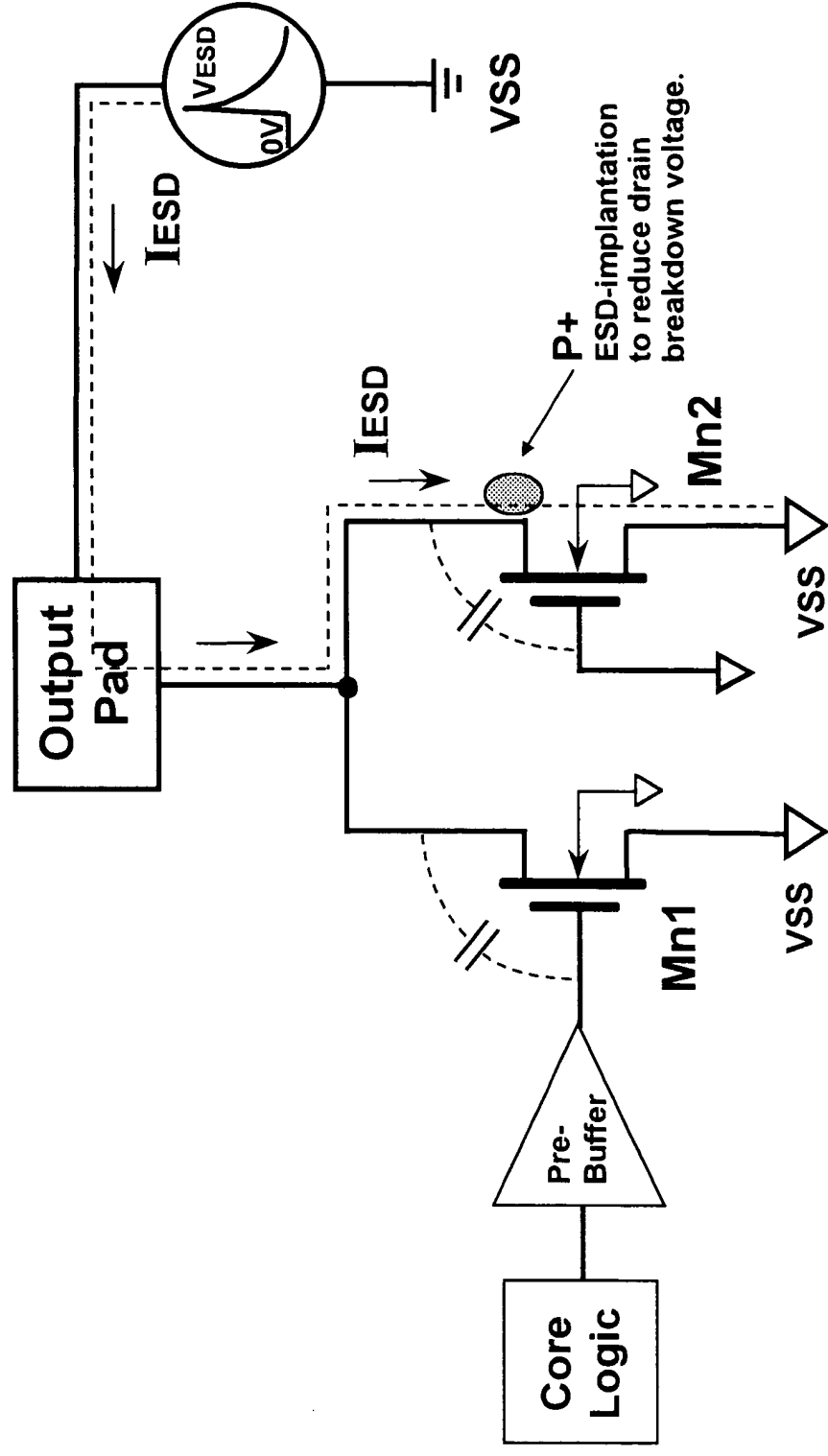


Fig.6(a)

Prior Art

Pre-Buffer

Output PAD

Metal

ESD-Implant region

P+

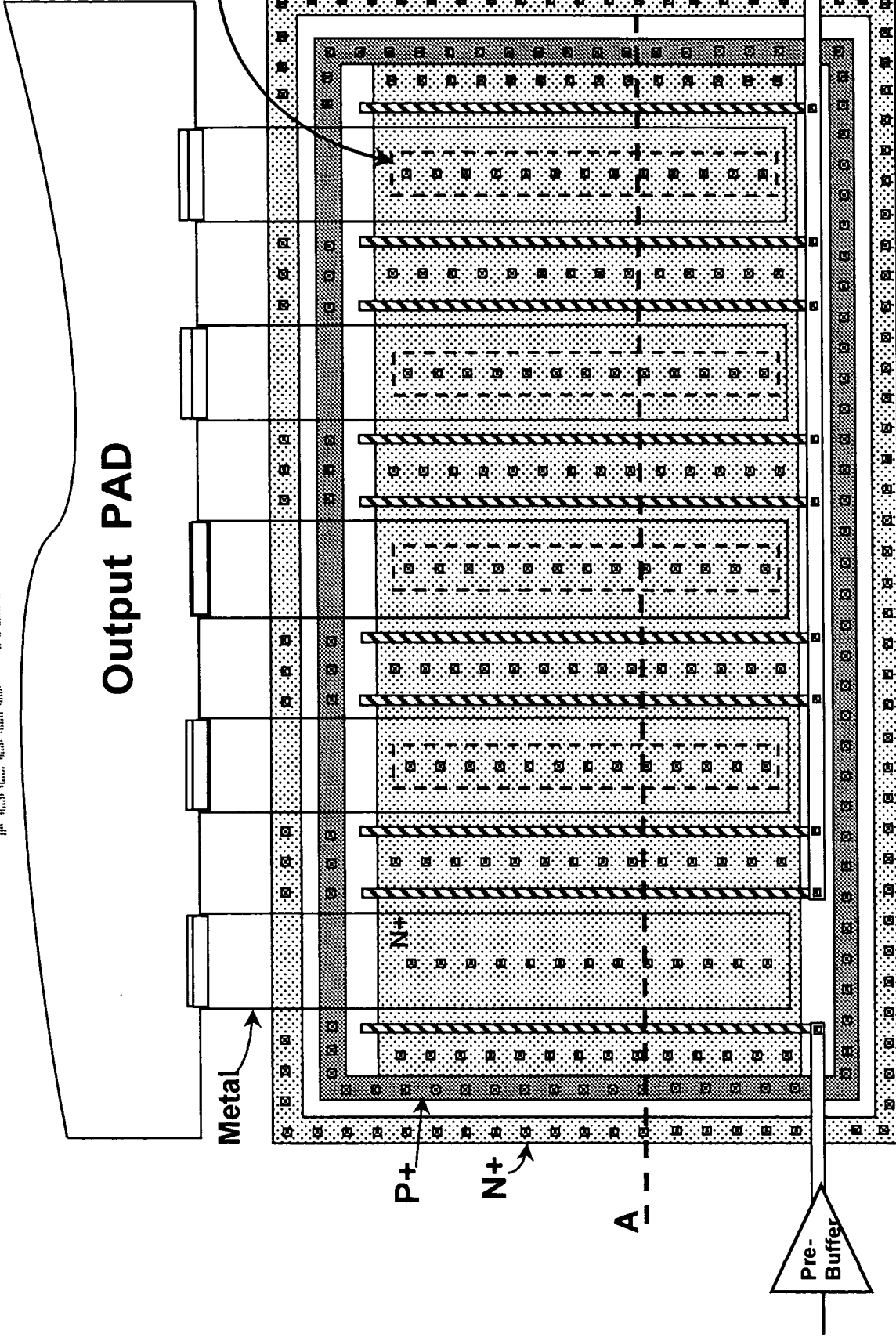
N+

A

A'

Pre-Buffer

Fig.6(b)
Prior Art



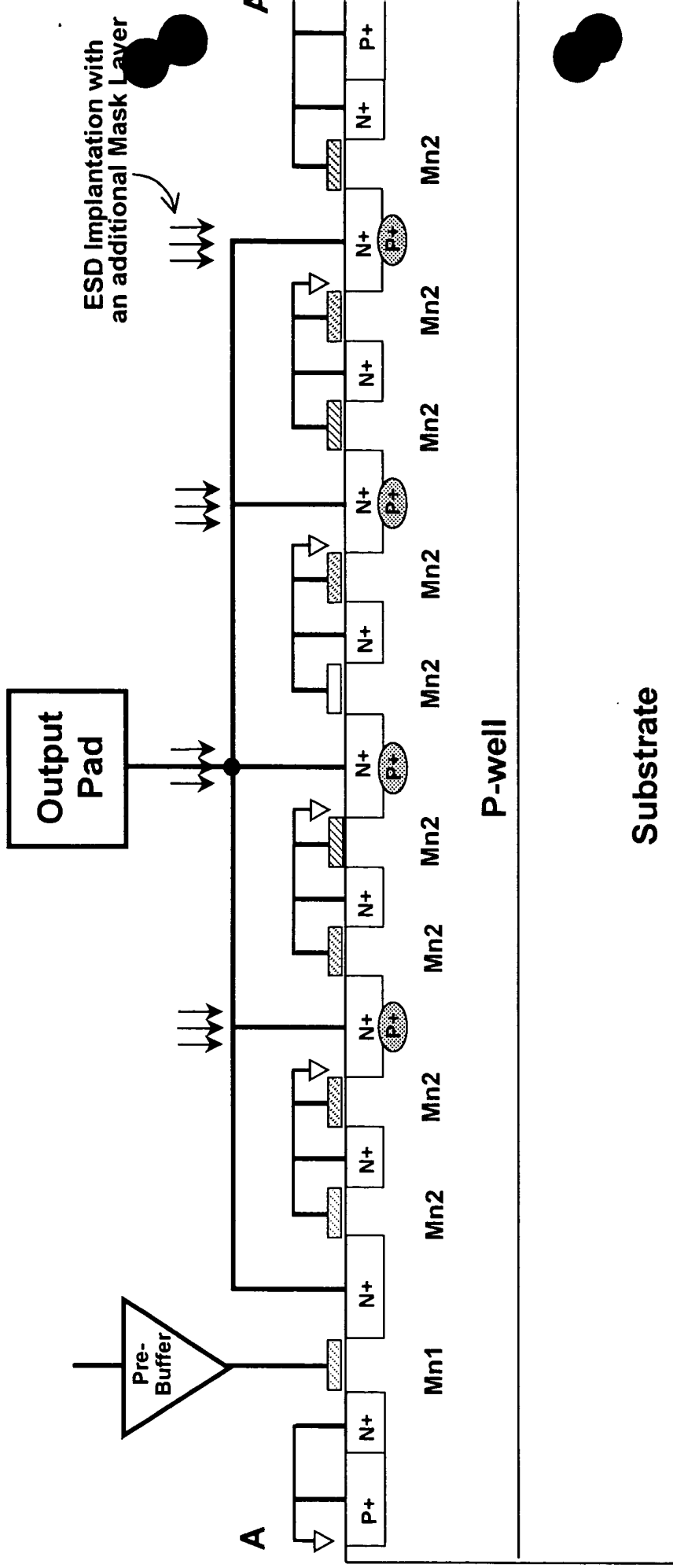


Fig.6(c)
Prior Art

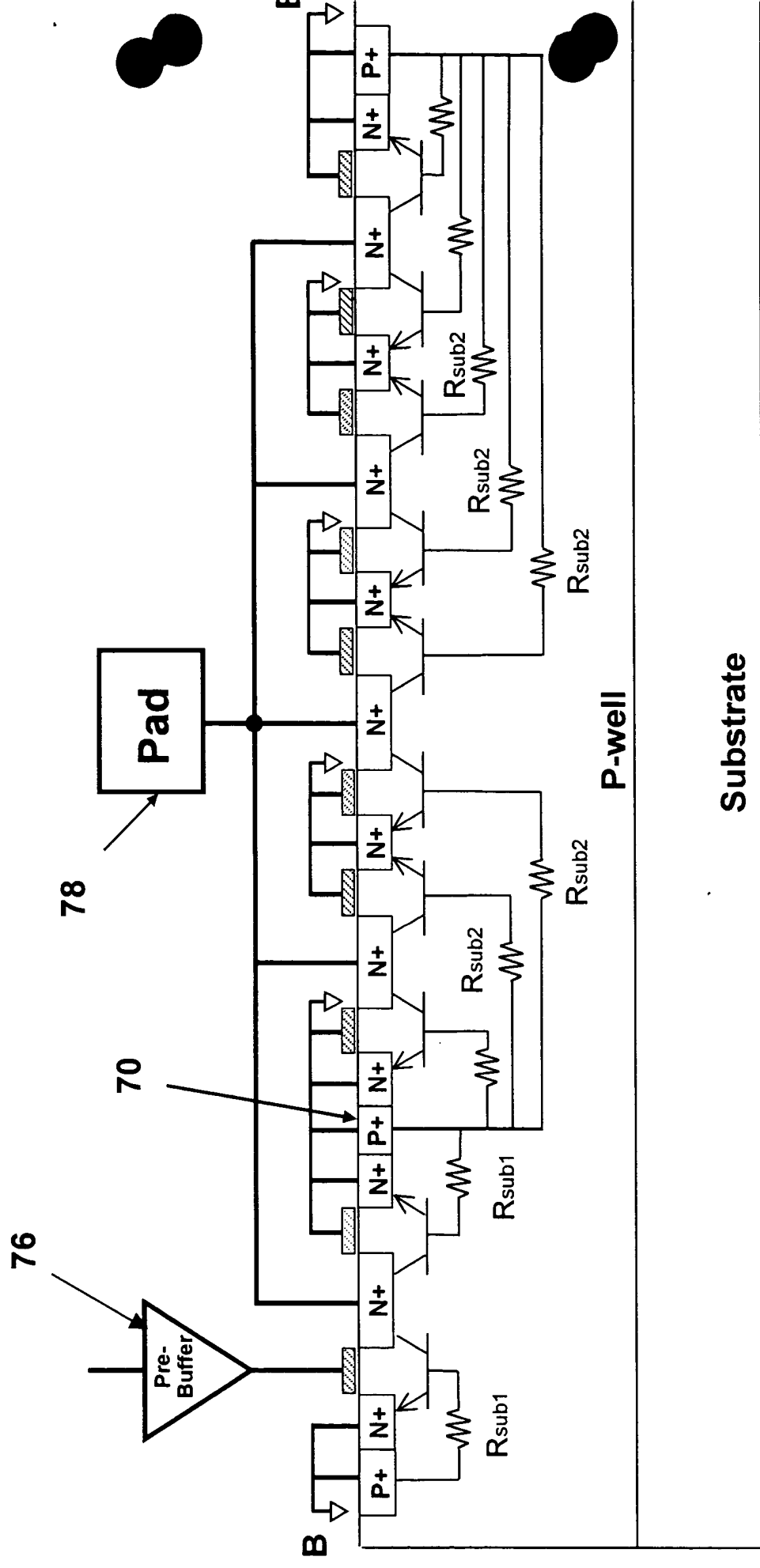


Fig.7(a)

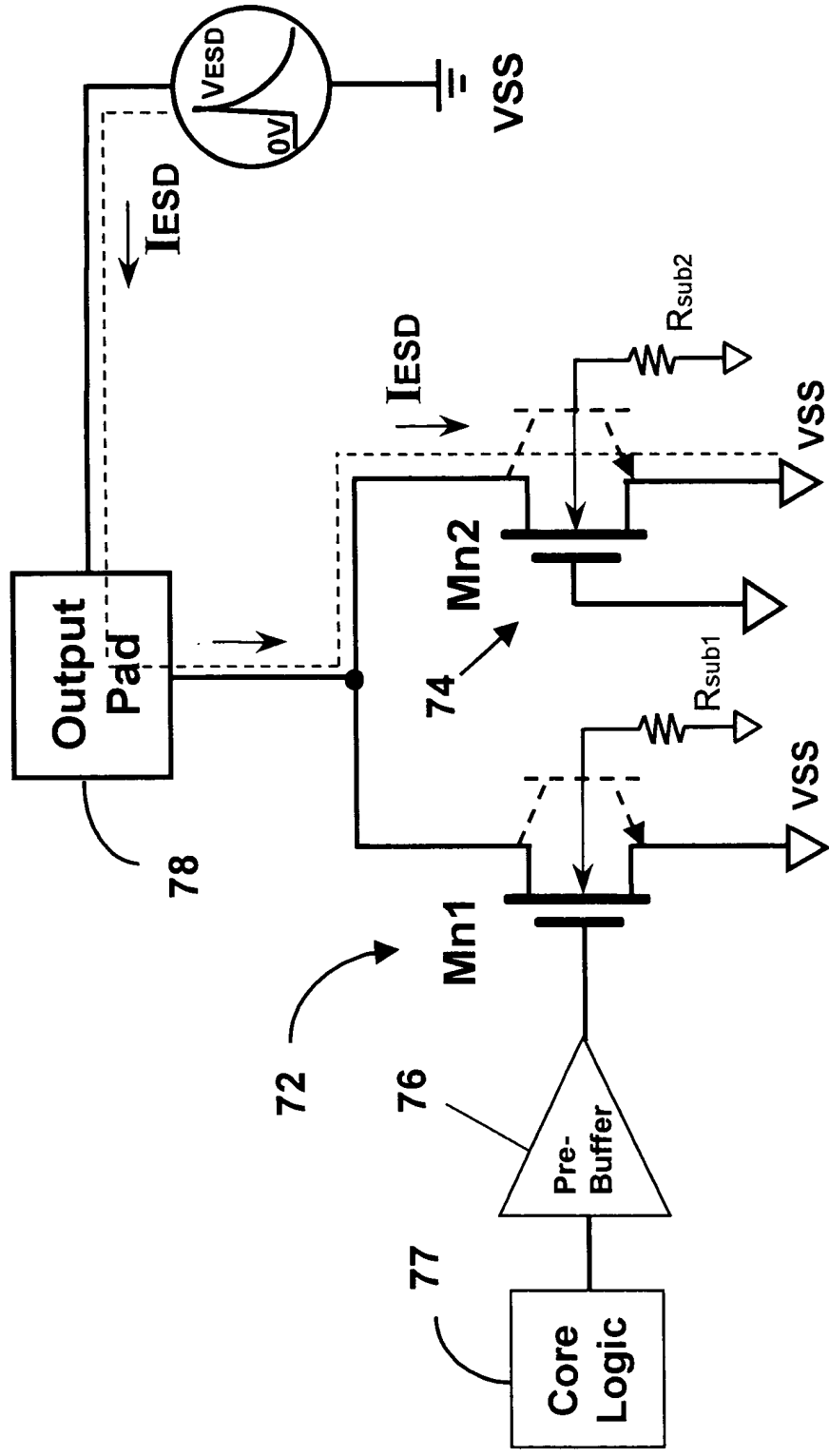


Fig. 7(b)

Output PAD

Metal

The additional
P+ pick-up diffusion

P+

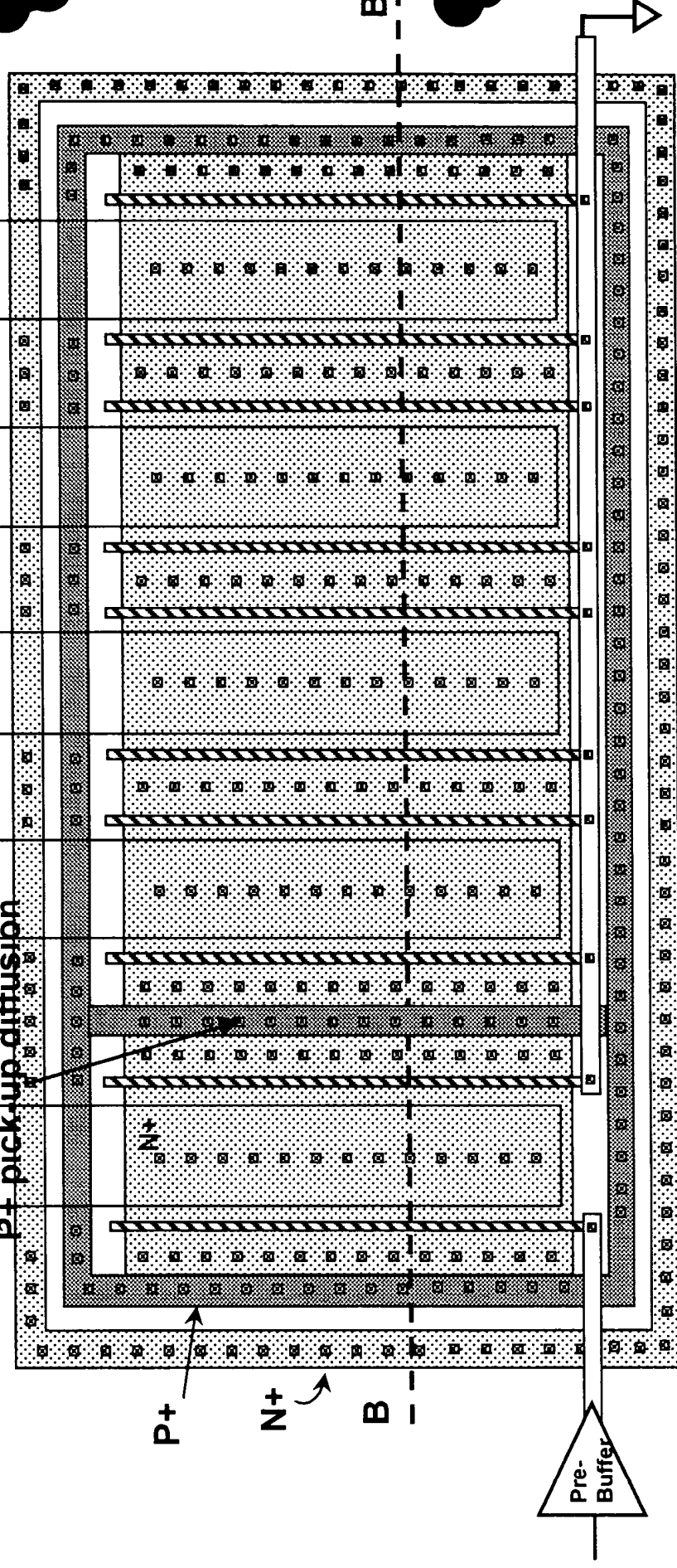
N+

B-

B'

Pre-
Buffer

Fig.7(c)



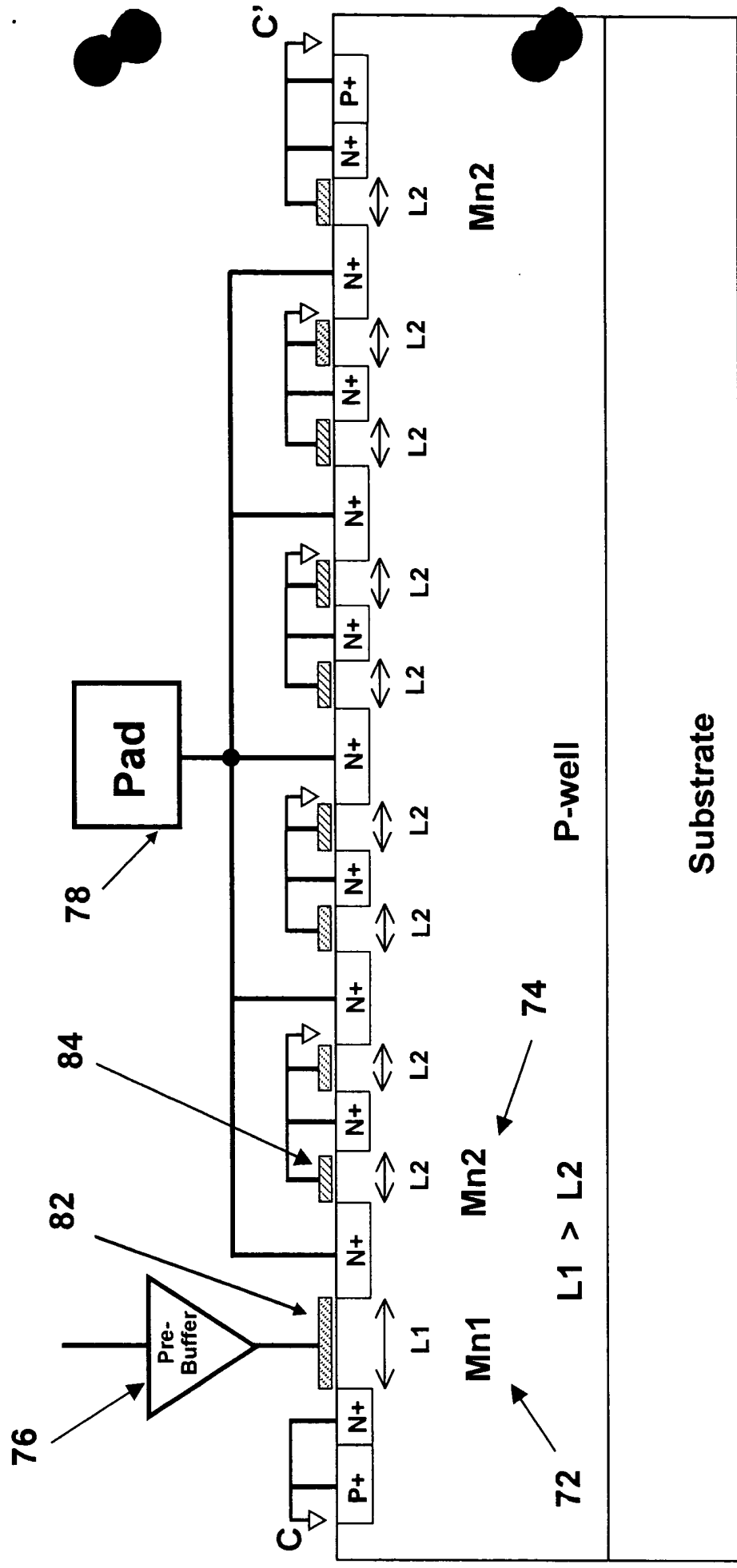


Fig. 8(a)

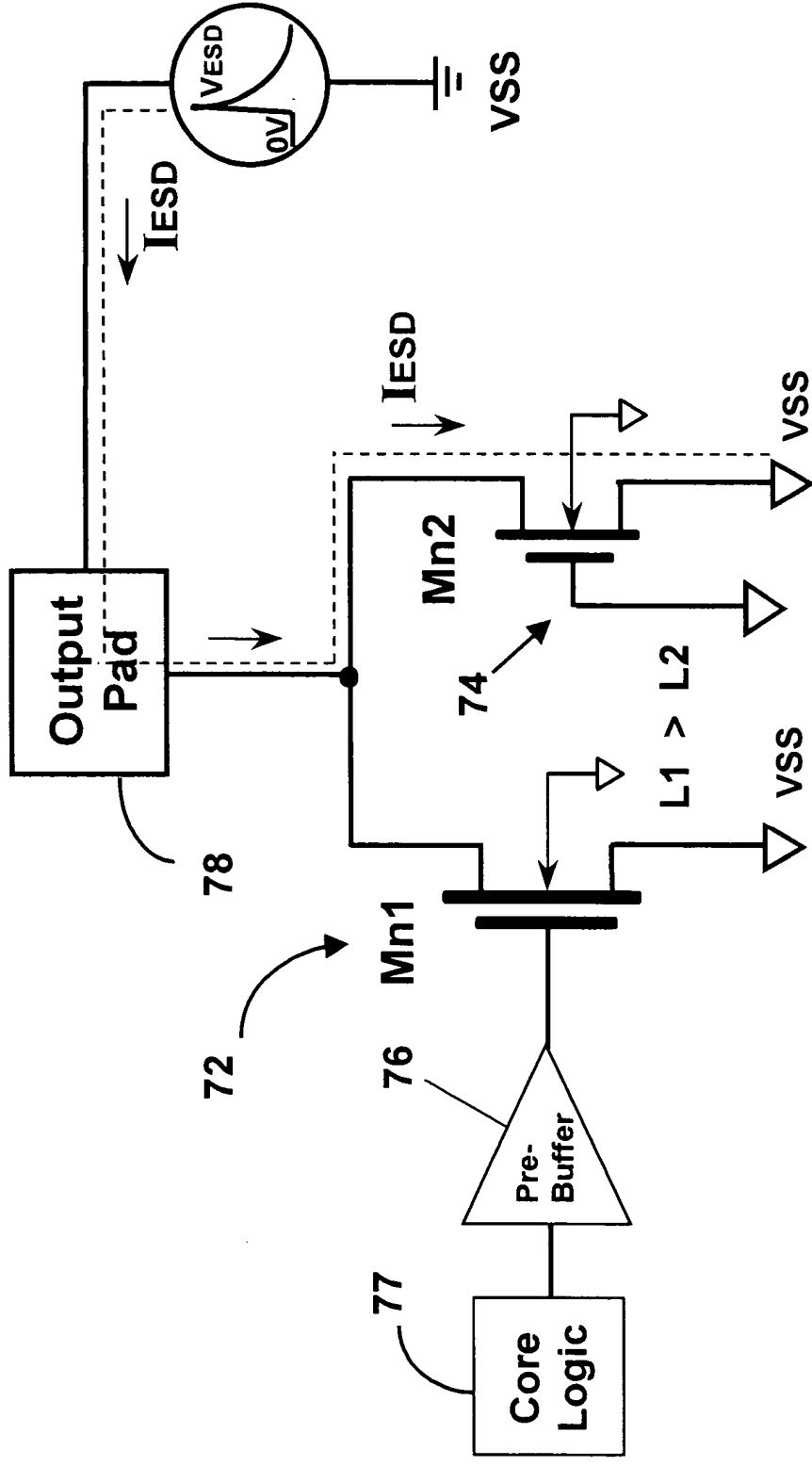


Fig.8(b)

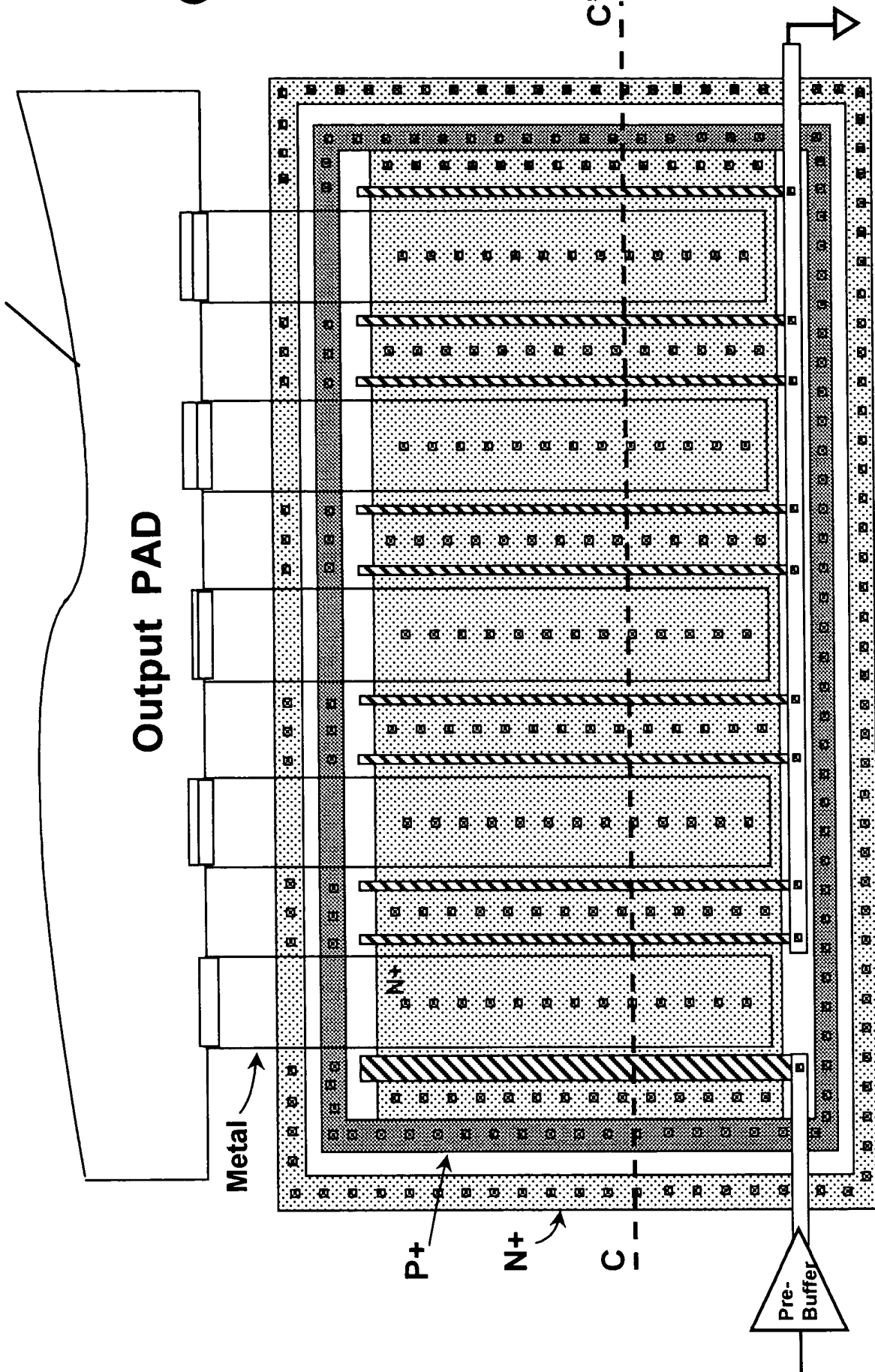


Fig.8(c)

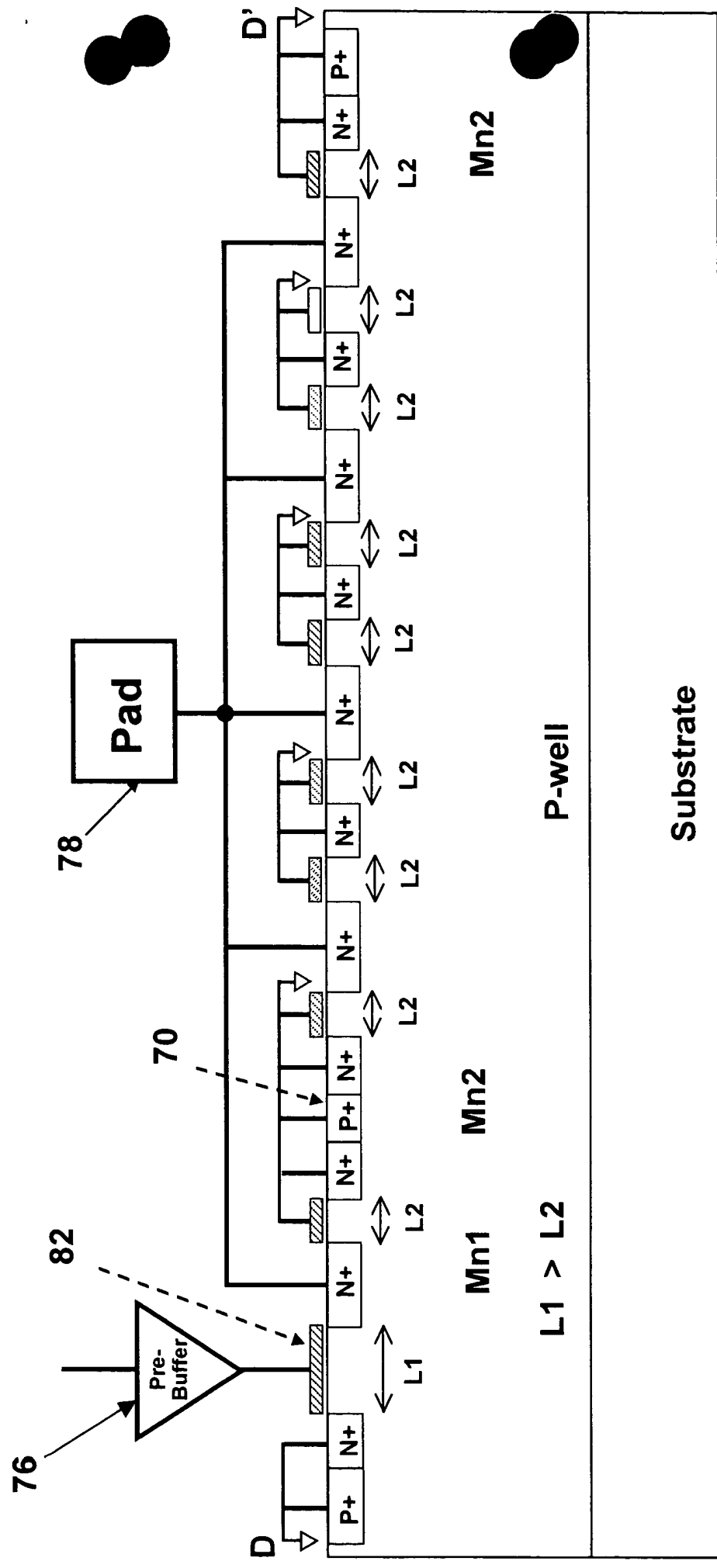


Fig. 9(a)

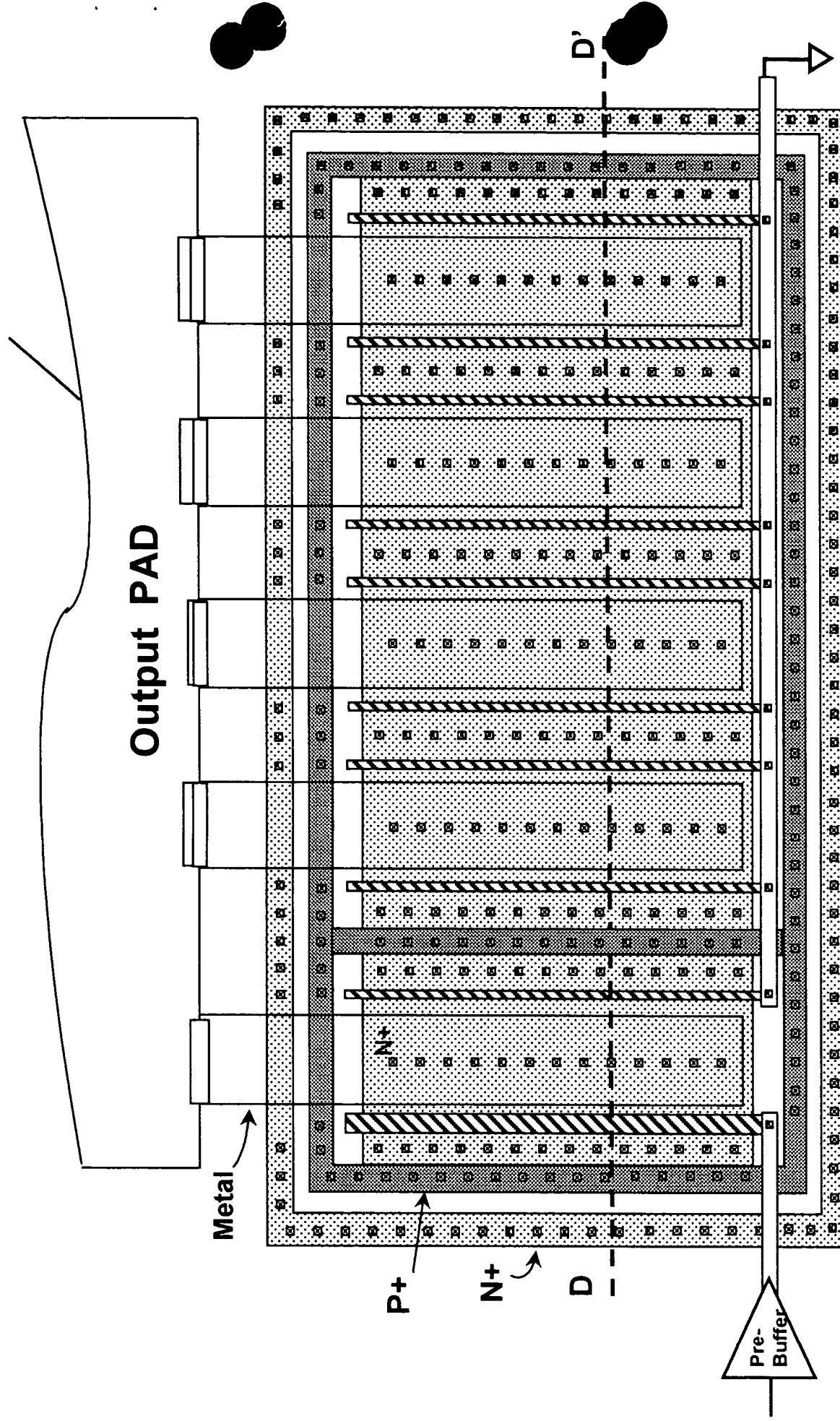


Fig. 9(b)

Input cell

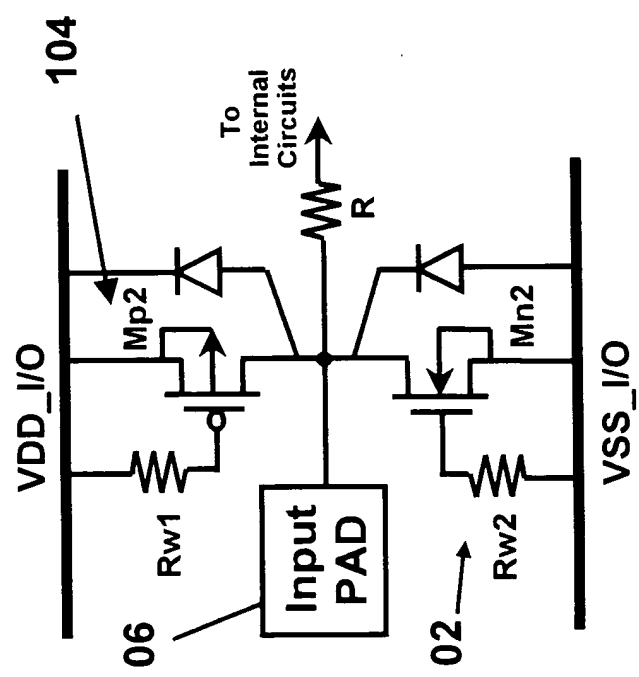


Fig.10(a)

Layout of Mn2 in the Input cell

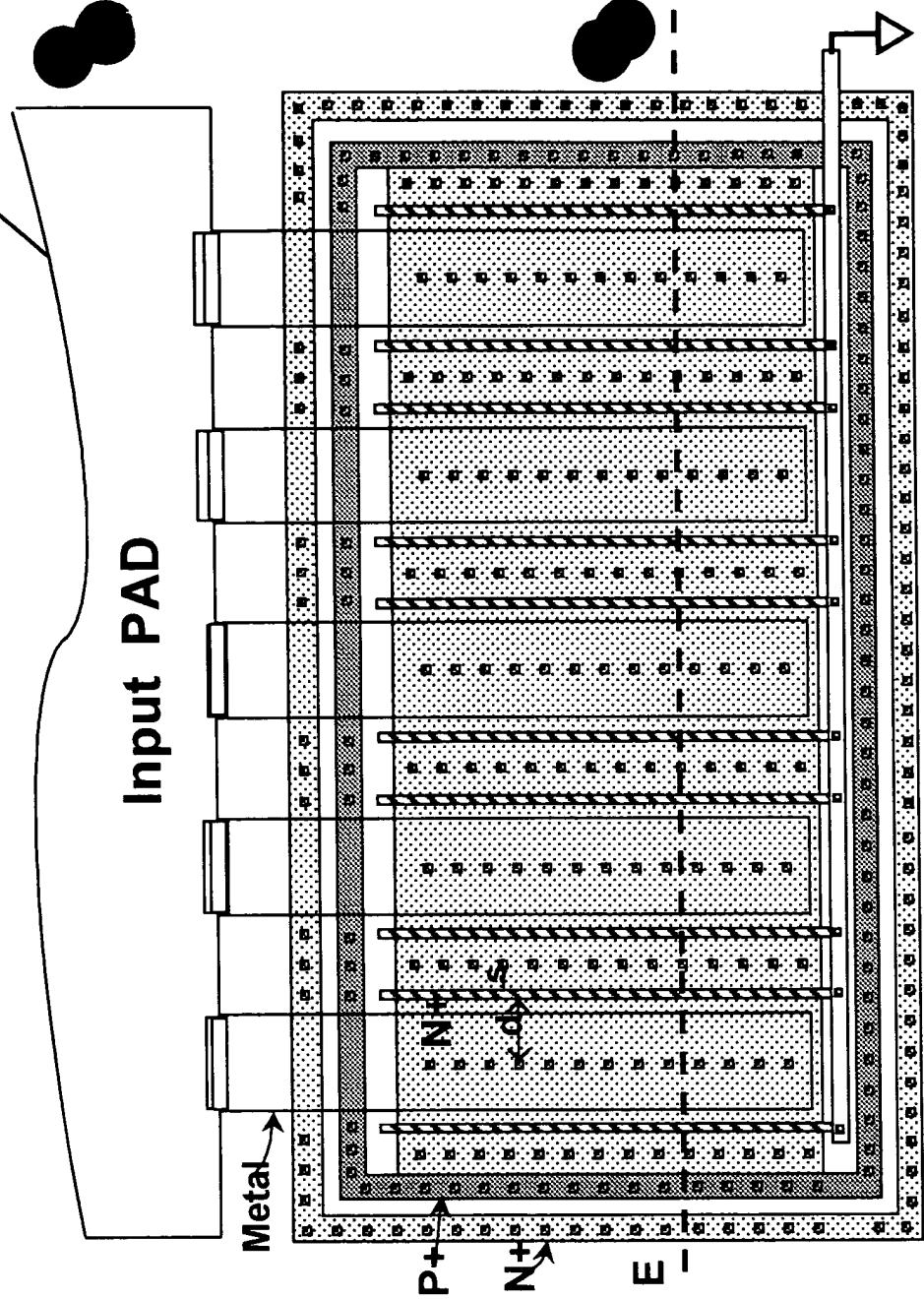


Fig.10(b)

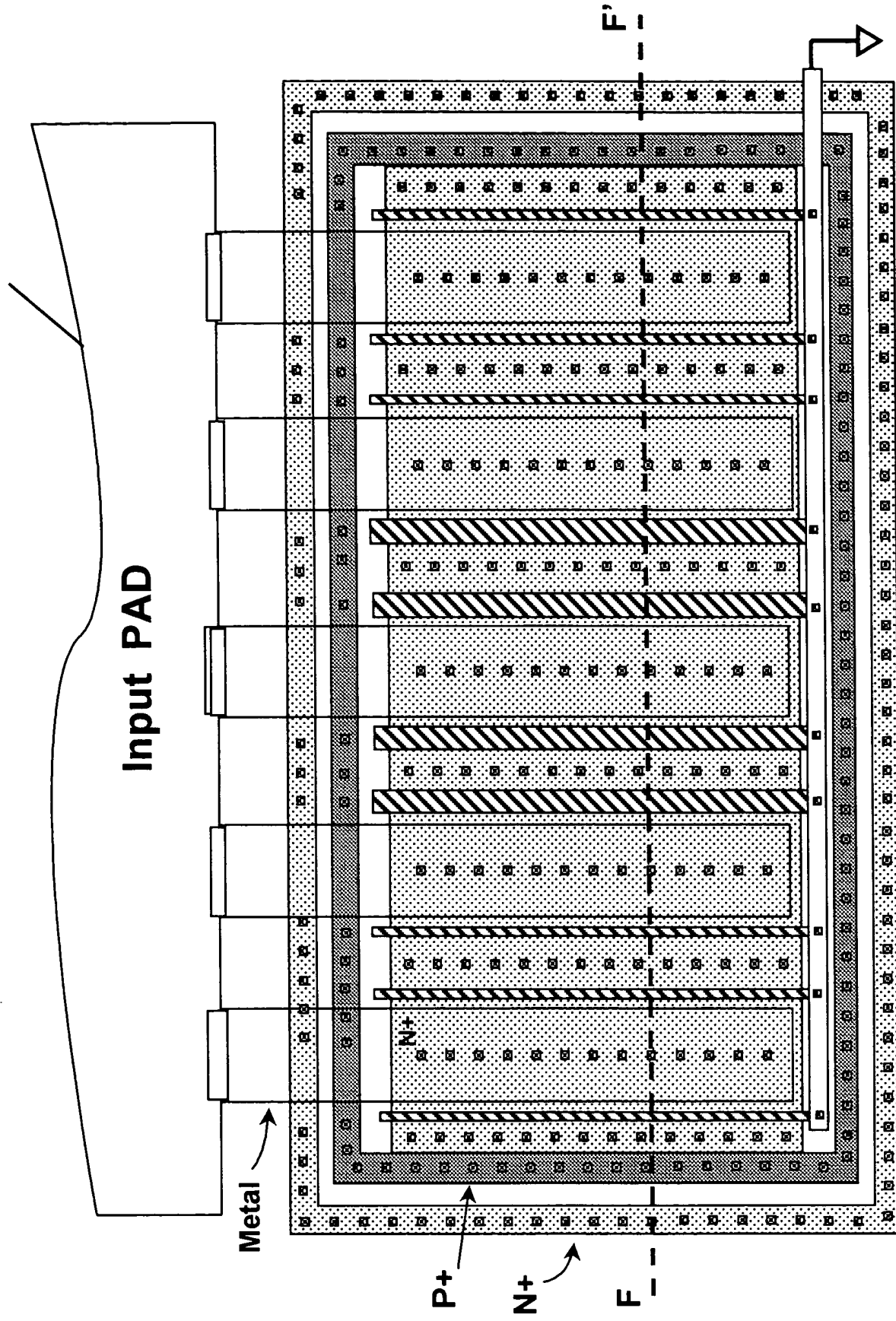


Fig.11(a)

106

Pad

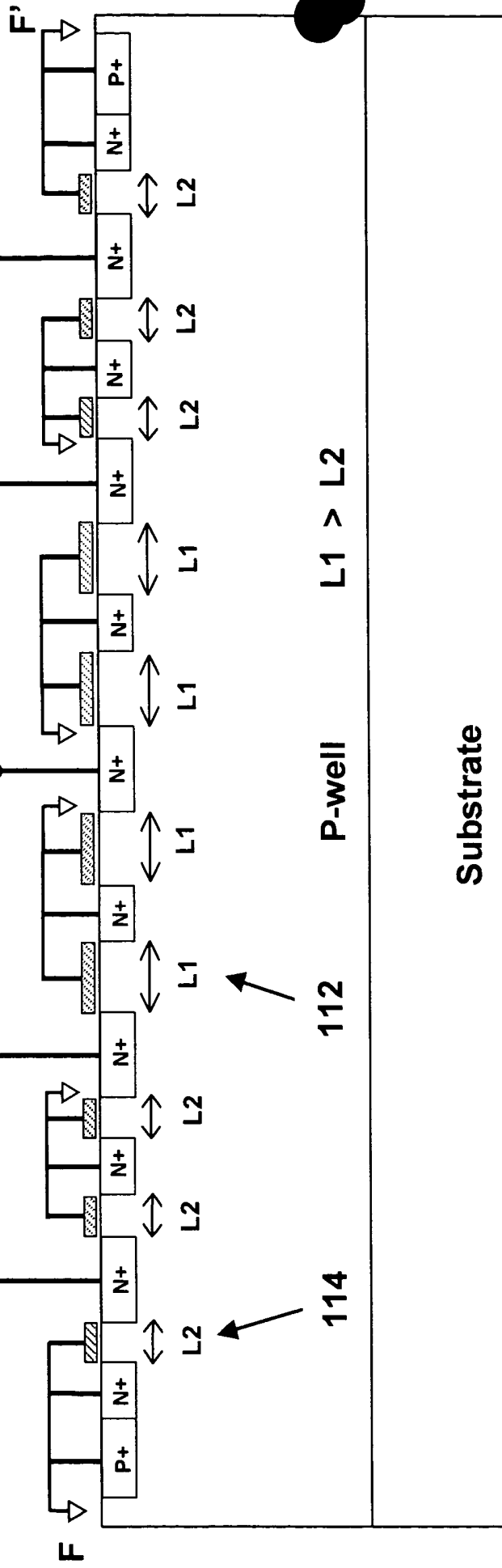


Fig.11(b)

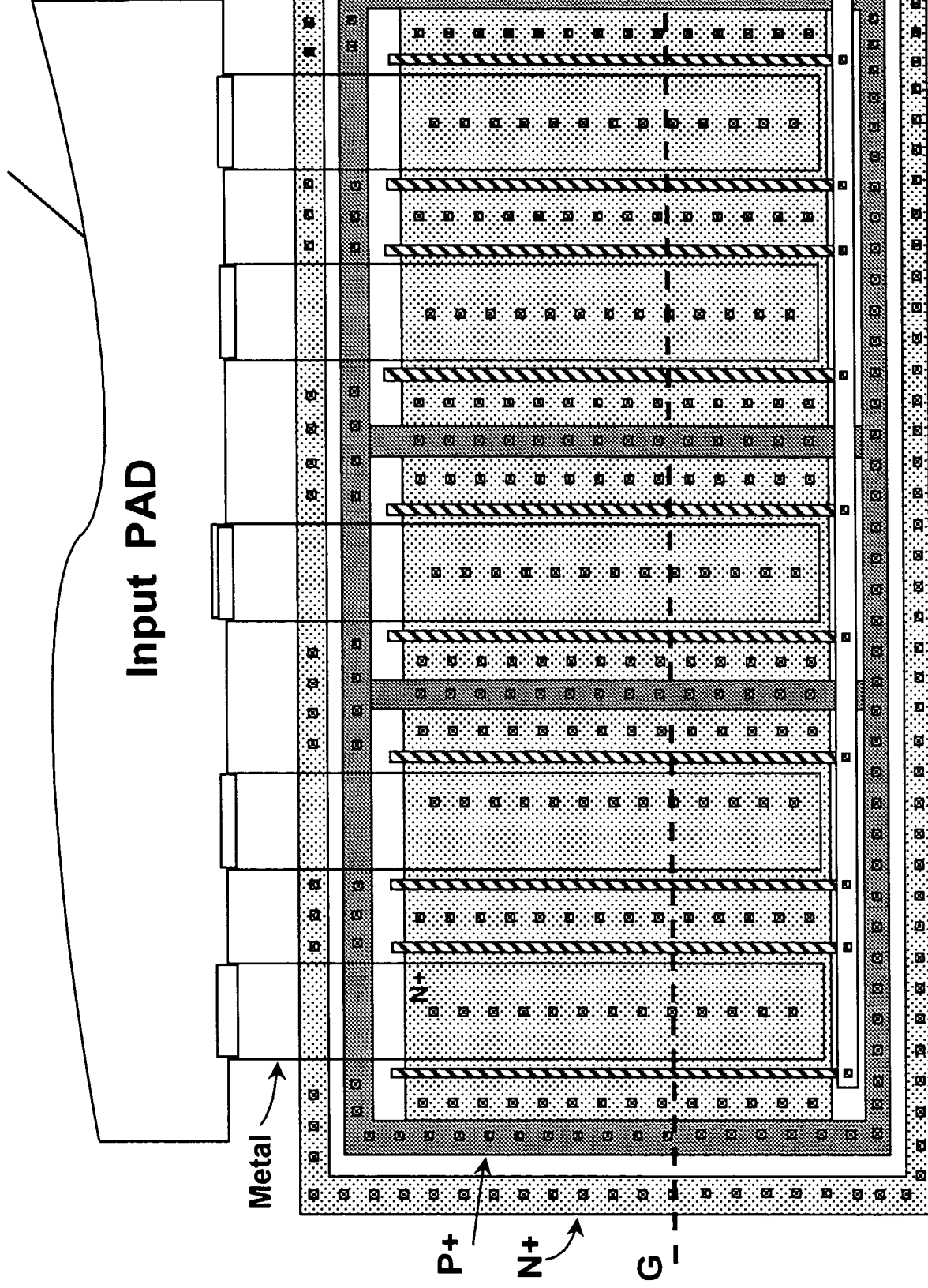


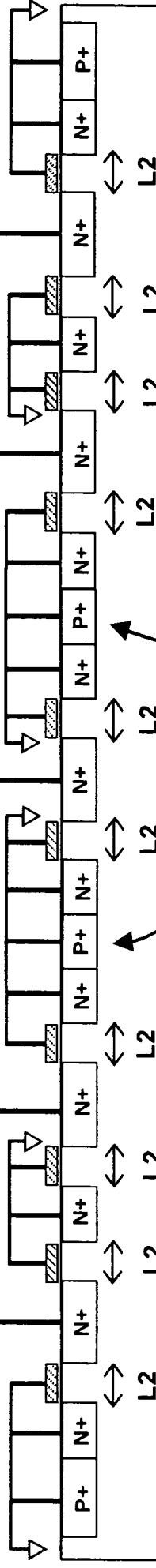
Fig.12(a)

106

Pad

G

G'



P-well 122

Substrate

Fig.12(b)

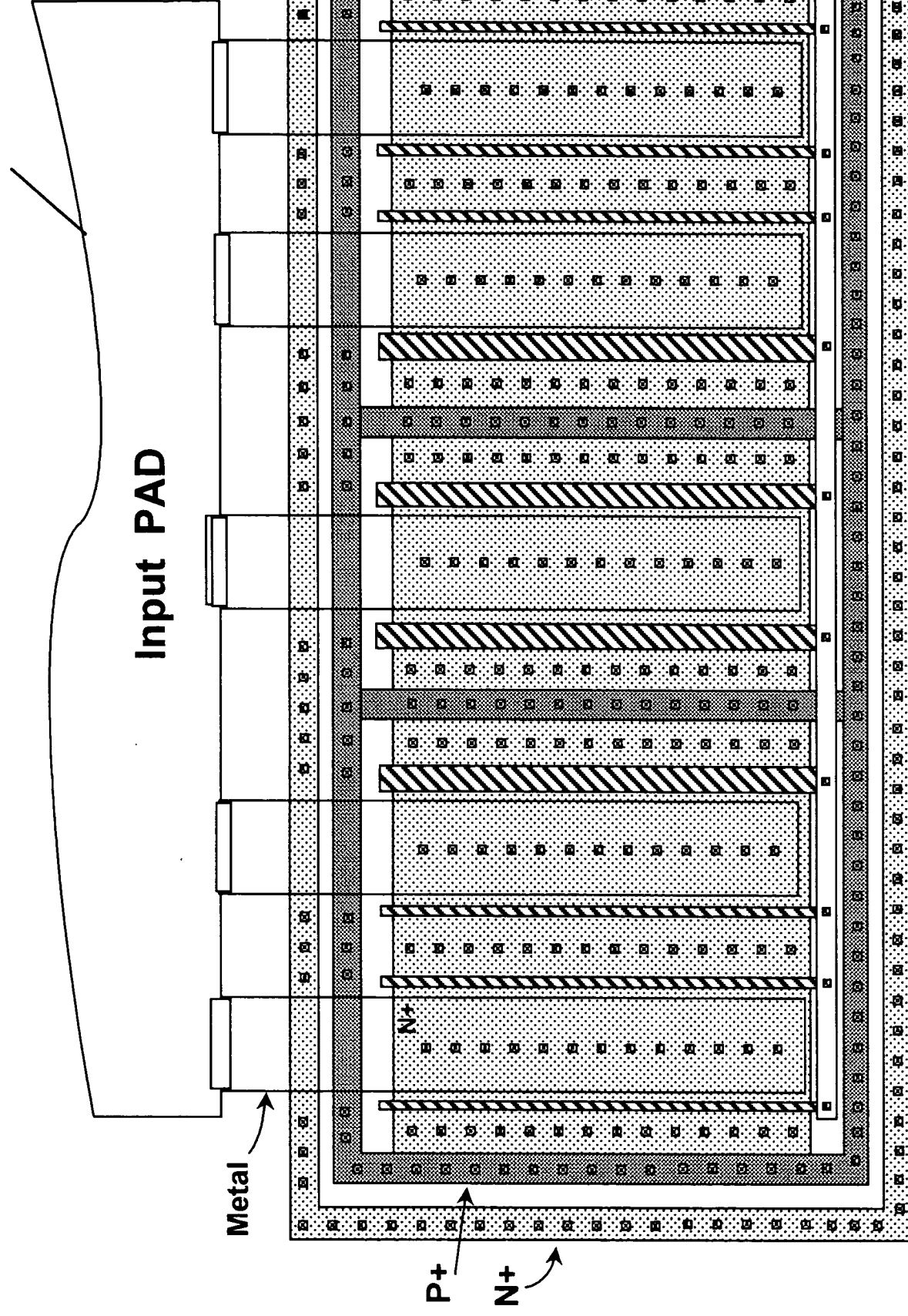


Fig.13

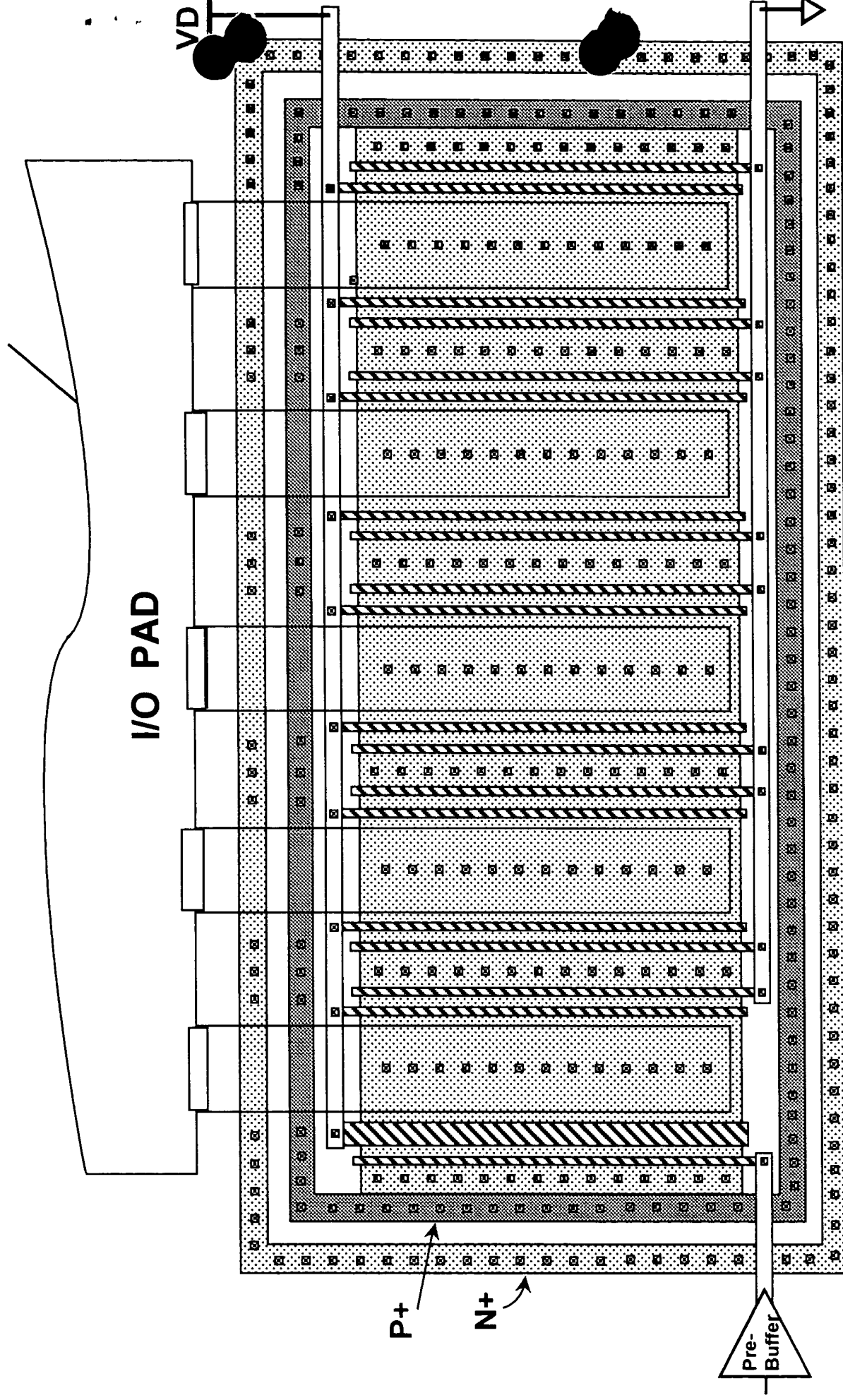


Fig.14(b)